

1. A method of inhibiting at least one of eosinophil recruitment or eosinophil function comprising administering a pharmaceutical composition comprising an isolated cytokine with eosinophil recruitment- or function-inhibitory activity in a pharmaceutically effective amount to inhibit  
5 eosinophil recruitment or eosinophil function selected from the group consisting of receptor expression, receptor internalization, signal transduction, transmigration, desensitization, degranulation, mediator release, oxidase activity, and combinations thereof.
2. The method of claim 1 wherein the isolated cytokine is selected from the group consisting of monokine induced by interferon  $\gamma$  (MIG), IFN- $\gamma$ -inducible protein of 10 kDa (IP-10), and combinations thereof.
3. The method of claim 1 wherein the isolated cytokine is a peptide derived from MIG or IP-10.
4. The method of claim 1 wherein the isolated cytokine is a protein homologous to MIG or IP-10.
5. The method of claim 1 wherein the composition is administered to an individual with eosinophilia.
6. The method of claim 1 wherein a signal transduction kinase function is perturbed.

7. The method of claim 1 wherein Erk1 or Erk2 is perturbed.
8. The method of claim 1 wherein transmigration is altered in at least one of lung, trachea, airway, bronchoalveolar lavage fluid, heart, or skin.

9. A method of reducing allergen-induced eosinophilia in a mammal comprising administering to a mammal exposed to an allergen a pharmaceutical composition comprising an isolated monokine induced by interferon  $\gamma$  (MIG) and/or an IFN- $\gamma$ -inducible protein of 10 kDa (IP-10) in a pharmaceutically effective amount to reduce allergen-induced eosinophilia.
10. The method of claim 9 wherein eosinophilia is reduced in an airway, lung, trachea, bronchoalveolar lavage fluid, or blood.
11. The method of claim 9 wherein eosinophilia is reduced in a body part affected by an allergy.
12. The method of claim 11 wherein the body part is selected from the group consisting of skin, eye, nose, gut, and combinations thereof.
13. The method of claim 9 wherein the mammal is a human.

14. A treatment method comprising administering to an individual a pharmaceutical composition comprising an isolated eosinophil-inhibitory cytokine in an amount sufficient to inhibit an eosinophil response to a chemoattractant.
15. The method of claim 14 wherein the cytokine is selected from the group consisting of monokine induced by interferon  $\gamma$  (MIG), an IFN- $\gamma$ -inducible protein of 10 kDa (IP-10), or combinations thereof.
16. The method of claim 14 wherein the chemoattractant is selected from the group consisting of eotaxin-1, eotaxin-2, eotaxin-3, MCP-2, MCP-3, MCP-4, MCP-5, RANTES, MIP-1a, and combinations thereof.
17. The method of claim 14 wherein the cytokine is administered at a dose in the range of about 10  $\mu\text{g/kg}$  to about 10  $\text{mg/kg}$ .
18. The method of claim 14 wherein the cytokine is administered at a dose of about 30  $\mu\text{g/kg}$ .
19. The method of claim 14 wherein the cytokine is administered systemically.

20. The method of claim 14 wherein the cytokine is administered by a route selected from the group consisting of intravenously, intranasally, intratracheally, subcutaneously, intramuscularly, orally, intraperitoneally, and combinations thereof.

21. A palliative method comprising administering a pharmaceutical composition comprising an isolated eosinophil-inhibitory cytokine in an amount to alleviate inflammation in at least one of an airway or tissue of a patient exposed to an allergen or having an eosinophilic syndrome.
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22. The method of claim 21 wherein the eosinophil-inhibitory cytokine is monokine induced by interferon  $\gamma$  (MIG) and/or an IFN- $\gamma$ -inducible protein of 10 kDa (IP-10).
23. The method of claim 21 wherein the allergen results in a condition selected from the group consisting of allergic rhinitis, asthma, eczema, and combinations thereof.

24. A method of inhibiting pulmonary eosinophil recruitment comprising administering to a mammal a pharmaceutical composition comprising an isolated monokine induced by interferon  $\gamma$  (MIG) and/or an IFN- $\gamma$ -inducible protein of 10 kDa (IP-10) in a pharmaceutically effective amount to inhibit pulmonary eosinophil recruitment.

25. The method of claim 24 administered prophylactically to an asthmatic individual.

26. The method of claim 24 administered therapeutically to an asthmatic individual.

27. A treatment method comprising providing to a patient an amount and formulation of a pharmaceutical composition containing at least one cytokine capable of negatively regulating an inflammatory cell within a lung of the patient.

28. The method of claim 27 wherein the patient is asthmatic, allergic, or has a hypereosinophilic disease.



29. A treatment method comprising administering to an individual with eosinophilia a cytokine selected from the group consisting of monokine induced by interferon  $\gamma$  (MIG), an IFN- $\gamma$ -inducible protein of 10 kDa (IP-10), or combinations thereof in a pharmaceutically acceptable formulation at a cytokine dose of up to about 10 mg/kg.
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30. The method of claim 29 wherein the cytokine alters an eosinophil function selected from the group consisting of migration, tissue recruitment, receptor binding, signal transduction, degranulation, mediator release, and combinations thereof.
31. The method of claim 29 wherein recruitment is responsive to an allergen and/or chemokine.
32. The method of claim 29 wherein MIG or IP-10 is administered to an asthmatic patient.
33. The method of claim 29 wherein MIG or IP-10 is administered to an allergic patient.

34. A method for alleviating asthma in a patient comprising administering to an asthmatic patient monokine induced by interferon  $\gamma$  (MIG) in a pharmaceutical composition thereby inhibiting an IL-13-associated asthmatic response in the patient.

35. A pharmaceutical composition comprising an isolated monokine induced by interferon  $\gamma$  (MIG) and/or an IFN- $\gamma$ -inducible protein of 10 kDa (IP-10) in a pharmaceutically acceptable formulation and an amount sufficient to alter eosinophil activity in the presence of an allergen.

36. The composition of claim 35 wherein the amount is a dose in the range of about 10  $\mu\text{g/kg}$  to about 10  $\text{mg/kg}$ .

37. A pharmaceutical composition comprising a cytokine which inhibits at least one eosinophil function in response to an eosinophil-induced stimulus.
38. The composition of claim 37 wherein the cytokine is selected from the group consisting of monokine induced by interferon  $\gamma$  (MIG), an IFN- $\gamma$ -inducible protein of 10 kDa (IP-10), or combinations thereof.
39. The composition of claim 37 wherein the stimulus is selected from the group consisting of an allergen, a chemokine, a cytokine, and combinations thereof.
40. The composition of claim 37 wherein the stimulus is selected from the group consisting of eotaxin-1, eotaxin-2, eotaxin-3, IL-13, platelet activating factor, and combinations thereof.
41. The composition of claim 37 wherein the stimulus is an allergic reaction, an infection, idiopathic eosinophilia, and combinations thereof.

42. A pharmaceutical composition comprising an isolated Th1-associated chemokine in a pharmaceutically acceptable formulation and in an amount sufficient to inhibit eosinophil activity in the presence of an allergen.

43. A pharmaceutical composition comprising a cytokine selected from the group consisting of recombinant monokine produced by interferon  $\gamma$  (MIG), a recombinant IFN- $\gamma$ -inducible protein of 10 kDa (IP-10), and combinations thereof in a pharmaceutically acceptable formulation and
- 5 dose sufficient to inhibit an eosinophil function.

44. A method of reducing *in vivo* eosinophil chemoattraction comprising administering to a patient a pharmaceutically acceptable formulation of a cytokine substantially lacking eosinophil chemoattraction activity and negatively affecting at least one of eosinophil chemoattraction or eosinophil activation activity.
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45. The method of claim 44 wherein the cytokine substantially lacking eosinophil chemoattraction is a Th1 cytokine.
46. The method of claim 44 wherein the cytokine substantially lacking eosinophil chemoattraction is at least one of MIG and IP-10.
47. The method of claim 44 wherein a Th2 cytokine is negatively affected.
48. The method of claim 44 wherein at least one of eotaxin-1, eotaxin-2, eotaxin-3, MCP-1, MCP-2, IL-4, IL-13, and platelet activating factor (PAF) is negatively affected.

49. A method of selectively treating an eosinophil associated disease in a patient comprising administering to a patient a Th1 associated chemokine thereby inhibiting eosinophil recruitment or eosinophil function.
50. The method of claim 49 wherein the Th1 associated chemokine is MIG or IP-10.